



SIGMA QUALITY CONTROL TEST PROCEDURE

Product Information

Enzymatic Assay of D-LACTIC DEHYDROGENASE (EC 1.1.1.28) Sigma Prod. Nos. L-2011, L-2395, L-3888, and L-9636

PRINCIPLE:



Abbreviations used:

β -NADH = β -Nicotinamide Adenine Dinucleotide, Reduced Form

β -NAD = β -Nicotinamide Adenine Dinucleotide, Oxidized Form

CONDITIONS: T = 25°C, pH = 7.0, A_{340nm}, Light path = 1 cm

METHOD: Continuous Spectrophotometric Rate Determination

REAGENTS:

- A. 100 mM Potassium Phosphate Buffer, pH 7.0 at 25°C
(Prepare 200 ml in deionized water using Potassium Phosphate, Monobasic, Anhydrous, Sigma Prod. No. P-5379. Adjust to pH 7.0 at 25°C with 1 M KOH.)
- B. 11 mM β -Nicotinamide Adenine Dinucleotide, Reduced Form Solution (β -NADH)
(Prepare 1 ml in cold deionized water using β -Nicotinamide Adenine Dinucleotide, Reduced Form, Disodium Salt, Sigma Prod. No. N-8129. **PREPARE FRESH.**)
- C. 20 mM Sodium Pyruvate Solution (Pyruvate)
(Prepare 1.0 ml in cold deionized water using Pyruvic Acid, Sodium Salt, Sigma Prod. No. P-2256.)
- D. 1.0% (w/v) Bovine Serum Albumin Solution (BSA)
(Prepare 50 ml in Reagent A using Albumin, Bovine, Sigma Prod. No. A-4503 or equivalent.)
- E. D-Lactic Dehydrogenase Enzyme Solution
(Immediately before use, prepare a solution containing 0.3 - 0.60 unit/ml of D-Lactic Dehydrogenase in cold Reagent D. **PREPARE FRESH.**)

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PROCEDURE:

Pipette (in milliliters) the following reagents into suitable cuvettes:

	<u>Test</u>	<u>Blank</u>
Reagent A (Buffer)	2.50	2.50
Reagent B (β -NADH)	0.05	0.05
Reagent C (Pyruvate)	0.10	0.10

Mix by inversion and equilibrate to 25°C. Monitor the $A_{340\text{nm}}$ until constant, using a suitably thermostatted spectrophotometer. Then add:

Reagent D (BSA)	-----	0.05
Reagent E (Enzyme Solution)	0.05	-----

Immediately mix by inversion and record the decrease in $A_{340\text{nm}}$ for approximately 5 minutes. Obtain the $\Delta A_{340\text{nm}}$ /minute using the maximum linear rate for both the Test and Blank.

CALCULATIONS:

$$\text{Units/ml enzyme} = \frac{(\Delta A_{340\text{nm}}/\text{min Test} - \Delta A_{340\text{nm}}/\text{min Blank})(2.7)(\text{df})}{(6.22)(0.05)}$$

2.7 = Total volume (in milliliters) of the assay

df = Dilution

6.22 = Millimolar extinction coefficient of β -NADH at 340 nm

0.05 = Volume (in milliliters) of assay

$$\text{Units/mg solid} = \frac{\text{units/ml enzyme}}{\text{mg solid/ml enzyme}}$$

$$\text{Units/mg protein} = \frac{\text{units/ml enzyme}}{\text{mg protein/ml enzyme}}$$

UNIT DEFINITION:

One unit will reduce 1.0 μ mole of pyruvate to D-lactate per minute at pH 7.0 at 25°C.

FINAL ASSAY CONCENTRATION:

In a 2.75 ml reaction mix, the final concentrations are 94 mM potassium phosphate, 0.20 mM β -nicotinamide adenine dinucleotide, reduced form, 0.74 mM pyruvate, 0.015 - 0.03 unit D-lactic dehydrogenase.

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NOTES:

1. This assay is based on the cited reference.
2. Where Sigma Product or Stock numbers are specified, equivalent reagents may be substituted.

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